



P2 Innovative Coatings and Coating Equipment Pilot Verification of Pollution Prevention Technologies Technology Profile: HVLP Coating Equipment

Brief Description

Coatings are applied in many industries including automotive, aerospace, manufacturing, and construction, for surface protection, product performance, and aesthetics. Coatings are formulated to meet these application requirements, and are applied by a number of different methods. High-volume, low-pressure (HVLP) coating equipment is an application method that was developed to reduce volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions that typically result from organic finishing operations.

Environmental Protection Benefits

The low air pressure of HVLP coating equipment results in a low-velocity air stream with larger average paint droplet size and lower paint particle momentum, when compared to traditional spray application equipment. These conditions combine to create less paint overspray, thus improving transfer efficiency (TE), which in turn leads to reduced paint usage, VOC and HAP emissions, solid and liquid waste disposal, and spray booth maintenance costs. Reduced overspray also provides a cleaner work environment with improved operator visibility. In the troposphere, VOCs rapidly combine with nitrogen oxides in the presence of sunlight to form photochemical oxidants, which are precursors to ground-level ozone or photochemical smog. Many VOCs, HAPs, or their subsequent reaction products cause gene mutation, cancer, or abnormal fetal development.

Federal Regulatory Applicability

Because of these detrimental effects, Titles I and III of the Clean Air Act Amendments of 1990 were established to control VOC and HAP emissions. Regulations requiring the use of coating technology that is at least as efficient as HVLP coating equipment have been adopted throughout the United States, with the intention of reducing volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions. For example, Rule 1511 of California's South Coast Air Quality Management District established the following definition of HVLP coating equipment on June 13, 1997:

Equipment used to apply coatings by means of a spray gun, which is designed to be operated and which is operated between 0.1 and 10 pounds per square inch gauge (psig) air pressure measured dynamically at the center of the air cap and at the air horns.

Verified Technologies

The following four HVLP spray guns have been verified as of March 31, 2000:

			
DeVilbiss JGHV ITW Industrial Finishing, Binks-DeVilbiss 1724 Indian Wood Circle Maumee, OH 43537-0200 Web: www.itwdevilbiss.com E-mail: rswiatecki@hotmail.com Contact: Ray Swiatecki Phone: 800-368-8419	DeVilbiss GTi ITW Automotive Refinishing 1724 Indian Wood Circle Maumee, OH 43537-0200 Web: www.itwdevilbiss.com Contact: Ray Reitz Phone: 800-445-3988	DeVilbiss FLG ITW Automotive Refinishing 1724 Indian Wood Circle Maumee, OH 43537-0200 Web: www.itwdevilbiss.com Contact: Ray Reitz Phone: 800-445-3988	Sharpe Platinum Sharpe Manufacturing Company 8750 Pioneer Blvd. Santa Fe Springs, CA 90670 Web: www.sharpe1.com E-mail: info@sharpe1.com Contact: Ron Zavala Phone: 800-742-7731

Additional HVLP spray guns can be verified by the ETV CCEP.

General Market Information

Technology End Users

HVLP coating equipment is used in a broad range of applications, from industrial production lines to automotive repair shops. HVLP coating equipment is a popular pollution prevention alternative because it serves as a drop-in substitute for traditional equipment that has a lower efficiency for transferring the coating to the part surface.

Equipment Costs

The capital costs of HVLP coating equipment are generally higher than comparable traditional air spray equipment. The cost of the HVLP coating equipment verified in these four tests ranged from \$175–\$450, as compared to air spray equipment, which costs \$100 or less. Shifting from traditional equipment to HVLP coating equipment may also require modifications to the existing air delivery system to ensure that the increased volume of air needed to operate the HVLP coating equipment is available. The operating costs of the HVLP and traditional equipment, however, are very similar. The economic advantage of the HVLP coating equipment is realized when reduced paint usage, solid and liquid waste generation, and paint spray booth maintenance are considered.

General Test Information

Concurrent Technologies Corporation (CTC)

CTC is serving as the verification organization for the ETV CCEP because of its commitment to environmental excellence and helping the U.S. industrial base achieve world-class agility and competitiveness. CTC operates the National Defense Center for Environmental Excellence (NDCEE) to address the Department of Defense's (DoD) environmental needs. CTC's facilities include full-scale, state-of-the-art organic finishing equipment, as well as the laboratory equipment required to test and evaluate organic coatings. The equipment and facilities have been made available for this program for the purpose of testing and verifying the abilities of finishing technologies.

Verification Factors

The HVLP coating equipment verification tests involved performance tests, in which the equipment applied a coating to standard test panels, followed by laboratory analyses, in which the conditions and results of the performance tests were characterized. The performance characteristics were then grouped into environmental and marketability factors.

The environmental factors were:

- Relative Transfer Efficiency
- Emissions Reduction
- Cost Savings
- Output Air Pressure

The marketability factors were:

- Dry Film Thickness
- Distinctness-Of-Image
- Gloss
- Visual Appearance

Each of the four HVLP spray guns was compared to a coating reference standard and a traditional air spray baseline, in which each baseline consisted of three traditional air spray guns with similar fluid delivery systems.

Verification Tests

The verification tests for these spray guns and the associated baselines were conducted from January 1999 through April 1999 at CTC's facilities in Johnstown, Pennsylvania. Verification Statements and Reports are available on the ETV Website at <http://www.epa.gov/etv/verifcpt.htm>.

For further information, contact:

Robert Fisher
Concurrent Technologies Corporation
100 CTC Drive
Johnstown, PA 15904
Phone: 814-269-2702; Fax: 814-269-6847
E-mail: fisherr@ctc.com



March 31, 2000